

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 7,377,261 B2
APPLICATION NO. : 10/568184
DATED : May 27, 2008
INVENTOR(S) : Y. Sukegawa et al.

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It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

IN THE CLAIMS

Column 33, line 28, through column 34, line 49, the claims should read:

29. A combustion control method according to claim 28, further of a spark ignition engine, comprising the steps of:

generating turbulence in an exhaust flow in an exhaust passage;
injecting fuel directly into a combustion chamber; and
injecting fuel in an expansion stroke in the case where a temperature of the engine is lower than a predetermined temperature.

~~- setting a time interval between a latest fuel injection initiation timing and an ignition initiation timing to 9 ms or more.~~

30. A combustion control method according to claim 26, further of a spark ignition engine, comprising the steps of:

causing penetration of injected fuel spray in a direction of an ignition plug longer than that in a direction of a piston;
in the case where a temperature of the engine is lower than a predetermined temperature, injecting fuel in a second half of a compression stroke so that an air-fuel ratio is in a vicinity of a theoretical air-fuel ratio; and
causing ignition timing to occur immediately before a compression stroke top dead center or later.

~~- injecting fuel into an intake port;~~
~~and in the case where the temperature of the engine is lower than the predetermined temperature, injecting fuel in an intake stroke.~~

31. A combustion control method of a spark ignition engine, comprising the steps of:

in the case where a temperature of the engine is lower than a predetermined temperature, generating a forward longitudinal vortex in a combustion chamber;

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IN THE CLAIMS

- injecting fuel in a second half of a compression stroke so that an air-fuel ratio is in a vicinity of a theoretical air-fuel ratio; and causing ignition timing to occur immediately before a compression stroke top dead center or later;
generating turbulence in an exhaust flow in an exhaust passage;
injecting fuel directly into a combustion chamber; and
injecting fuel in an expansion stroke in the case where a temperature of the engine is lower than a predetermined temperature.
32. A combustion control method of a spark ignition engine, comprising the steps of:
causing penetration of injected fuel spray in a direction of an ignition plug longer than that in a direction of a piston;
in the case where a temperature of the engine is lower than a predetermined temperature, generating a forward longitudinal vortex in a combustion chamber;
injecting fuel in a second half of a compression stroke so that an air-fuel ratio is in a vicinity of a theoretical air-fuel ratio; and
causing ignition timing to occur immediately before a compression stroke top dead center or later.
33. A combustion control method ~~of a spark ignition engine~~ according to Claim 31, comprising the steps of:
regulating the strength of a forward longitudinal vortex generated in a combustion chamber so that a magnitude of a fluctuation of engine speed or torque fluctuation is a predetermined value or less; and
delaying ignition timing to an extent possible.
~~in the case where a temperature of the engine is lower than a predetermined temperature, generating a forward longitudinal vortex in a combustion chamber;~~
~~injecting fuel in a second half of a compression stroke so that an air-fuel ratio is in a vicinity of a theoretical air-fuel ratio; and~~
~~causing ignition timing to occur immediately before a compression stroke top dead center or later.~~

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IN THE CLAIMS

34. A combustion control method ~~according to claim 33 of a spark ignition engine,~~ comprising the steps of:
~~in the case where a temperature of the engine is lower than a predetermined temperature, injecting fuel in a second half of a compression stroke so that an air-fuel ratio is in a vicinity of a theoretical air-fuel ratio;~~
~~regulating an injection pressure of fuel so that a magnitude of a fluctuation of engine speed or torque fluctuation is a predetermined value or less; and~~
~~delaying ignition timing to an extent possible.~~
~~- regulating the strength of a forward longitudinal vortex generated in a combustion chamber so that a magnitude of a fluctuation of engine speed or torque fluctuation is a predetermined value or less; and~~
~~- delaying ignition timing to an extent possible.~~
35. A combustion control method ~~of a spark ignition engine according to Claim 28,~~ further comprising the steps of:
~~setting a time interval between a latest fuel injection initiation timing and an ignition initiation timing to 9 ms or more.~~
~~- causing penetration of injected fuel spray in a direction of an ignition plug longer than that in the direction of a piston;~~
~~- in the case where a temperature of the engine is lower than a predetermined temperature, generating a forward longitudinal vortex in a combustion chamber;~~
~~- injecting fuel in a second half of a compression stroke so that an air-fuel ratio is in a vicinity of a theoretical air-fuel ratio; and~~
~~- causing ignition timing to occur immediately before or later than a compression stroke top dead center.~~

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IN THE CLAIMS

36. A combustion control method ~~of a spark ignition engine, according to Claim 26,~~ ~~further comprising the steps of:~~
~~injecting fuel into an intake port; and~~
~~in the case where the temperature of the engine is lower than the~~
~~predetermined temperature, injecting fuel in an intake stroke,~~
~~a second half of a compression stroke so that an air fuel ratio is in a vicinity of a~~
~~theoretical air fuel ratio;~~
~~regulating an injection pressure of fuel so that a magnitude of a fluctuation of~~
~~engine speed or torque fluctuation is a predetermined value or less; and~~
~~delaying ignition timing to an extent possible.~~

Signed and Sealed this

Second Day of September, 2008



JON W. DUDAS
Director of the United States Patent and Trademark Office